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THE PROBLEM OF SEE THE COLORS IN THE GRAPHIC DESIGN TO COLOR BLINDNESS PATIENTS

رضى عمى الألوانعند التصميمات الجرافيكية المطبوعة فيالألوان رؤيةمشكل

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Abstract: -

This research explains the problem of use of colors in graphic design such as (logos, posters, and so on) to patients with color blindness, Color blindness is one of human diseases, in this disease changed many concepts The first change is the concept of art, That the color component has a big role in art and design, this disease is mostly a hereditary disease for males than females. Many graphic designers didn't put into consideration when choosing the color groups for their designs how color blindness patients see these designs?

So this research will focus about this point because the color element in graphic design is very important and take a big role in graphic design field to attract users. This research explains definition color blindness disease & Disease's reasons & Kinds of Disease and answered What color blindness patients see?

The research explains The Ishihara test is a color perception test for red-green color deficiencies. It was named after its designer, Dr. Shinobu Ishihara, a professor at the University of Tokyo, who first published his tests in 1917, the research explains the details about this test .

And this research focus that There are theories of color for graphic design, the designers used its such Complementary / contrast between warm color & cold color (red+green). So Logos, posters, and so on missed the message in eye's color blindness patients because color in their design didn't clear for them. finally the research shows some designers used 2 colors red with green in design logo, poster, and so on , so their design miss the beauty and may be miss the message for color blindness patients.

Keywords: - *logos, posters, patients, concepts*

INTRODUCTION

This research explains the problem of use of colors in logos , posters, and so on to patients with color blindness, Color blindness is one of human diseases , in this disease changed many concepts The first change is the concept of art , That the color component has a big role in art and design , this disease is mostly a hereditary disease for males than females, The gene which is responsible for the condition is carried on the X chromosome and this is the reason why many more men are affected than women .

It effects 8% of men while this percentage to less than 5% among women (study of chemistry scientific John Dalton)

There are estimated to be over 250 million color blind people worldwide.

Another study tell that many of patients didn't know that they have this disease until do a test for colors (study of Dr. Mendil)

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So this research will focus about this point because the color element in graphic design is very important and take a big role in advertising field to attract users

The problem of research

There are a problem for color blindness patients that they see the colors in graphic design field different than the healthy people so they miss the messages of these designs so the researcher wants to focus about this point for graphic designers to put into consideration when choosing the color groups for their designs for publishing in society.

Definition color blindness disease

It is the inability to distinguish between some or all colors , Mother carrying the disease in their genes and she didn't know it , this disease is mostly a hereditary disease for males than females.

There are three types of cone cells and each type has a different sensitivity to light wavelengths. One type of cone perceives blue light, another perceives green and the third perceives red. When you look at an object, light enters your eye and stimulates the cone cells. Your brain then interprets the signals from the cones cells so that you can see the color of the object. The red, green and blue cones all work together allowing you to see the whole spectrum of colors.

Disease's reasons

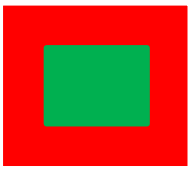
Caused by a defect in the eye or optic nerve or brain or because of exposure to some chemicals sometimes.

Kinds of Disease

- Monochrome: in this kind people with monochromatic color blindness lack all cone receptors in their eyes and can't see any color, they see the all of things with 2 color only white and black (grayscale) like the old film without color.
- People with dichromatic color blindness: they lack either redgreen or blue-yellow receptors and can't see hues in these respective ranges.

People with color weakness, or anomalous trichromatic, can perceive a color but need greater intensity of the associated wavelength in order to see it normally. The natural aging process in humans may also reduce color vision and acuity.

What color blindness patients see?



The normal people see the flower (red +green) , it corresponds to the theory of contrast in graphic design field , which tell us that the designers can use one warm color like red with one cold color like green to attractive people.

But Don't assume that the lightness you perceive will be the same as the lightness perceived by people with color deficits. You can generally assume that they will see less contrast between colors than you will. If you lighten the light colors and darken the dark colors in your design. You will increase its visual accessibility. So this theory isn't true for Color blindness people because it doesn't attractive them.

This disease is diagnosed through a special test to see colors called (Ishihara test)

The Ishihara test

The Ishihara test is a color perception test for red-green color deficiencies. It was named after its designer, Dr. Shinobu Ishihara, a professor at the University of Tokyo, who first published his tests in 1917.

The test consists of a number of colored plates, called Ishihara plates, each of which contains a circle of dots appearing randomized in color and size. Within the pattern are dots which form a number or shape clearly visible to those with normal color vision, and invisible, or difficult to see, to those with a red-green color vision defect, or the other way around. The full test consists of 38 plates, but the existence of a deficiency is usually clear after a few plates. There is also the smaller test consisting only 24 plates.

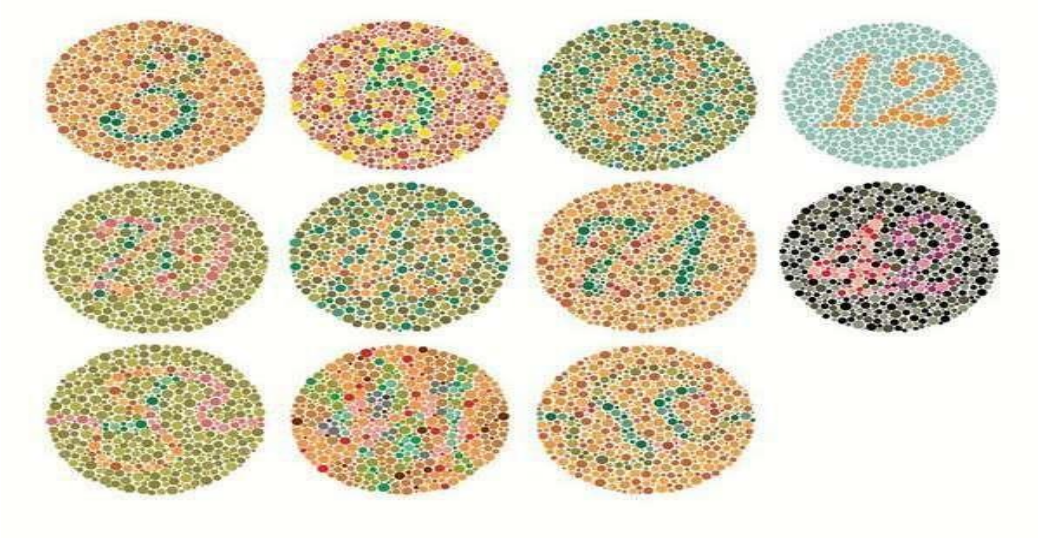
The plates make up several different test designs

Transformation plates: individuals with color vision defect should see a different figure from individuals with normal color vision.

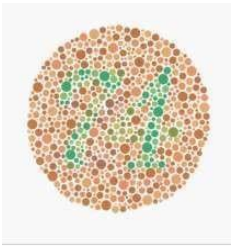
Vanishing plates: only individuals with normal color vision could recognize the figure.

Hidden digit plates: only individuals with color vision defect could recognize the figure.

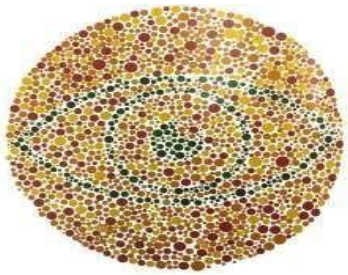
Diagnostic plates: intended to determine the type of color vision defect (protanopia or deuteranopia) and the severity of



Ishihara test



The normal person can see the number in circle (74) and read it But color blindness patient can't see the number or may be read (21)



This simulation of a color blindness test graphic is like those used to diagnose red-green difficulties. people with this type of color vision deficiency cannot see the eye shape within the pattern.

What is color?

Color is derived from light , either natural or artificial, our eyes have three types of color receptor cells: red, green, and blue. As a result, all incoming light is reduced to these three colors . all perceived colors are generated by a mixture of these three colors. However, not every color can be seen by humans, those that can are therefore called the visible

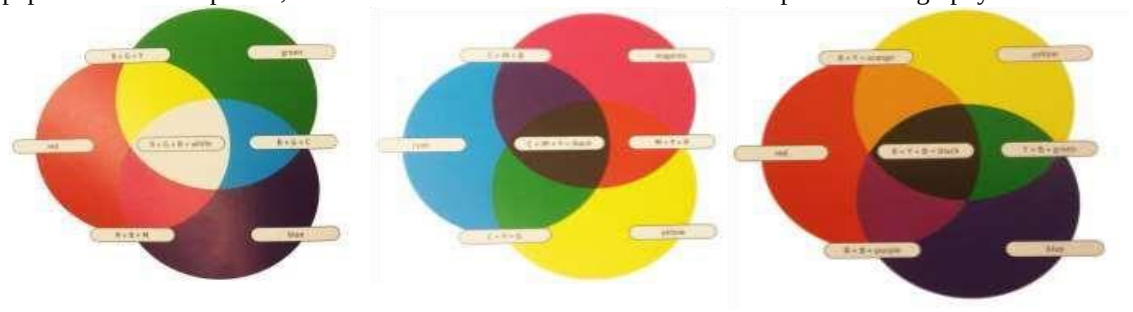
spectrum. People can distinguish approximately 10 million colors, this visible spectrum is called the human color space. Not everyone's colorsensing cells respond alike , so identification of a specific color is highly subjective.

Primary colors

There are two types of primary colors: additive and subtractive. Our eyes have red, green, and blue (RGB) Color receptors. RGB are the primary colors of pure light and are referred to as addictive primary colors. The subtractive primary colors, made from reflected light, fall into two types: the printer's primaries, which are cyan, magenta, and yellow (CMY), and the artist's primaries, which are red, yellow, and blue (RYB). Artist's primaries, though nonscientific, are used as the basis for most color theory.

Designers utilize all three types of primary colors. They select colors using

RYB and color theories. Then they generate layouts on computer screens in RGB, and then perhaps translate them into ink on paper with CMY – plus K, or black – to form the CMYK of four – color process lithography.



Additive color (CMY Model) The RGB primaries (light)

Subtractive Mixing (RYB Model) The CMY primaries (Transparent Pigments)

Subtractive Mixing (RGB Model) The RYB primaries (Opaque Pigments)

Color blindness see color differently

Designing for people with partial sight and color deficiencies by Aries Arditi, ph.D

These are the three basic guidelines for making effective color choices that work for nearly everyone. Following the guidelines are explanations of the three perceptul attributes of color – hue, lightness, and saturation – as they are used by vision scientists.

Partial sight , aging, and congenital color deficits all produce changes in perception that reduce the visual effectiveness of certain color combinations. Two colors that contrast sharply to someone with normal vision may be far less distinguish-able to someone with a visual disorder. It is important to appreciate that the contrast of colors, one against another, that makes them more or less discernible, rather than the individual colors themselves. Here are three simple rules for making effective color choices.

With color deficits , the ability to discriminate colors on the basis of all three attributes – hue, lightness, and saturation- is reduced .

Designers can help compensate for these deficits by making colors differ more dramatically in all three attributes.

Details about Chromatic interaction

There are theories of color for graphic design , the designers used its such as

- Complementary: two color appearing opposite each other on the color wheel are complements of each other. their mixture results in a neutral tone , or neutral . with light the neutral is a medium gray ; with ink it's a dull brown

For example

COMPLEMENTARY COLORS: buzz when they get close to each other, and neutralize each other when mixed. If you cover up the heart and blur your vision, you'll perceive a less intense olive color where the pure red and green mix more evenly. The increase red numbers in the heart area appropriately changes its relative intensity.

- In graphic design when the designers choose the color group, the designers depend on some theories which depended the relationship between the cold color such as (green/ blue/ violet) and the warm color such as (red/ yellow/ orange) some designers didn't consider color blindness disease so they choose in their designs 2 color (one from warm colour) such as green and the other (cold color) such as red that the problem for color blindness patients, it is not as effective.

For examples / some designers used 2 colors red with green in design logo, poster, and so on, so their design misses the beauty and may be miss the message for color blindness patients

Logos missed the theory of contrast in eye's color blindess patient, although the designers depand on it

Logos missed the theory of contrast in eye's color blindess patient, although the designers depand on it.

poster missed the theory of contrast and concept in eye's color blindess patient

The research results

1. It is clear from the study that some designers in graphic design used 2 colors red with green in their designs, so their design miss the beauty and may be miss the message for color blindness patients.
2. It is clear that the theory of COMPLEMENTARY COLORS not compatible with color blindness patients.

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